

Disparities in Access to Bariatric Surgery in Texas 2013–2017

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ABSTRACT

Background: Access to bariatric care varies across regions, ethnic, and racial groups. Some of these variations may be due to insurance status or socioeconomic status. There are also regional and state variations in access to metabolic and bariatric surgery (MBS). The Texas Inpatient Public Use Data File (IPUDF) and Texas Outpatient Public Use Data File is a state-mandated database that collects information on demographics, procedures, diagnoses, and cost on almost all admissions in Texas. We used them to examine racial disparities in MBS over a 5-y period.

Methods: The IPUDF and Texas Outpatient Public Use Data File were examined from the years 2013 through, 2017. We included all patients undergoing a laparoscopic Roux-en-Y gastric bypass and sleeve gastrectomy and examined the demographics of these patients. Race and ethnicity are reported separately. We used U.S. Census Bureau statistics and the Texas Department of State Health Services statistics to determine the crude (unadjusted) and adjusted procedure rates of patients undergoing MBS.

Results: In the IPUUDF, the crude unadjusted procedure rate for blacks undergoing MBS was 7.29 per 10,000 population followed by 6.85 per 10,000 for non-Hispanic whites. Hispanics had the lowest rate at 3.20 per 10,000. When adjusted for sex, obesity, age, and race, blacks still had a higher rate of access followed by whites and then Hispanics.

Conclusions: There are disparities to access for bariatric surgery in Texas. Blacks have the greatest access followed by whites. Hispanics have the lowest procedure rate per population.

Key Words: access to care, bariatric surgery, racial differences in access, administrative databases.

INTRODUCTION

Bariatric surgery is the most effective treatment for obesity and obesity-related illnesses. The percentage of the population of the United States suffering from the disease of obesity continues to climb. The most recent estimates from the Centers for Disease Control and Prevention state that 39.8% of the adult population has body mass index (BMI) of 30 kg/m² or greater.¹ Despite this, only a fraction of eligible patients are referred for metabolic and bariatric surgery (MBS) and even less undergo surgery.² In addition to a general lack of access to MBS, there are differences in access based on socioeconomic factors, race, and ethnicity. Martin et al.³ looked at this disparity using the 2005–2006 National Health and Nutrition Examination Survey and found only 0.4% of patients eligible for MBS actually underwent surgery. They also found an overwhelming majority of MBS patients were white and had private insurance. A more recent study from 2010 using the National Inpatient Sample showed that rural-dwelling patients who are nonwhite, male, poorer, older, sicker, and nonprivately insured almost never received bariatric surgery.⁴ In 2015, the Metabolic Surgery Accreditation and Quality Improvement Program (MBSAQIP) (currently the largest and most comprehensive database for MBS and captures racial and ethnic data, but not insurance status) was used to look at racial disparities in clinical outcomes and showed longer length of stay and higher morbidity and mortality in black patients undergoing sleeve gastrectomy (SG).⁵ They also demonstrated that black patients made up 18.2% of the total but did not mention Hispanics.

There are various administrative and clinical databases currently available that provide us with data on racial, ethnic, and socioeconomic variables that can affect access

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Disclosure: none.

Funding/Financial Support: none.

Conflicts of Interest: The authors declare no conflict of interest.

Informed consent: Dr. Clapp declares that written informed consent was obtained from the patient/s for publication of this study/report and any accompanying images.

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DOI: 10.4293/JSLS.2020.00016

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to MBS. Texas is a large state within the United States and has a population of 28.7 million residents.⁶ The Texas Department of Health Statistics maintains inpatient and outpatient administrative databases. Our group has previously described these databases in detail.⁷ Texas has the second largest population in the United States by state and a larger-than-average percentage of population with Hispanic ethnicity. We proposed using the Texas Inpatient and Outpatient Public Use Data Files (IPUDF and OPUDF) to examine disparities in access to MBS for the years 2013–2017. Our hypothesis was that racial minorities have less access to weight loss surgery.

METHODS

The Texas IPUDF and OPUDF were examined from the years 2013 through 2017. We included all patients undergoing a laparoscopic Roux-en-Y gastric bypass (LRYGB) or SG and examined the demographics of these patients. The databases use the *International Classification of Diseases*, versions 9 and 10, for procedure and diagnoses codes and Current Procedural Terminology codes. Race and ethnicity are reported separately. We used the U.S. Census Bureau statistics to determine the crude (unadjusted) procedure rate of patients undergoing MBS. We reported rates per 10,000 population. The U.S. Census Bureau uses a BMI of 30 kg/m² as its cutoff for obesity and does not use a BMI of 35 kg/m² when it calculates obesity rates. We therefore had to use a BMI of 30 kg/m² when we were adjusting for rates of obesity in the general population.

The Texas IPUDF and OPUDF are statutorily mandated administrative databases.^{8,9} They collect data from most hospitals in Texas with the exception of federal facilities and hospitals in counties with a population of less than 35,000. Also exempt from reporting are facilities that do not seek reimbursement from government sources. This reporting results in more than 36,000,000 records a year.

Statistical Methods

Quantitative variables were described using mean and standard deviations. Categorical variables were similarly described using frequency and proportions. Student's *t* test and χ^2 tests were used to assess the disparities across race and ethnicity, inpatient versus outpatient care, and across years. This gave us our crude unadjusted rates, which we reported per 10,000 population. We then adjusted for female sex, race, age 18–69 years, and obesity (BMI > 30 kg/m²) using the 2015 data from the Texas Department of Health Statistics.¹⁰ Values of *P* < 5% were

considered statistically significant. All analyses were carried out using STATA version 15 (STATA Corp., College Station, Texas).

RESULTS

In the PUDF, the crude unadjusted procedure rate for blacks undergoing MBS was 7.29 per 10,000 population followed by 6.85 per 10,000 for non-Hispanic whites. Hispanics had the lowest rate at 3.20 per 10,000. After adjusting for female sex, race, age 18–69 years, and obesity (BMI > 30 kg/m²), black females had the highest rate of surgery at 6.37%, non-Hispanic white females had a rate of 0.8%, and Hispanic females had the lowest rate of 0.25%. These adjusted numbers were for the year 2015 because that was the only year with complete data available.

There were 99,501 patients who underwent bariatric surgery from 2013 through 2017 in both databases. **Table 1** shows the breakdown by race and ethnicity as well as by year. Non-Hispanic whites were most patients at 54.3% of patients having surgery. **Table 2** is a summary descriptive of racial and ethnic disparities by age, length of stay, gender, and insurance. The percentage of Hispanics undergoing surgery increased from 21.1% in 2013 to 26.2% in 2017.

Length of stay was not significantly different between groups (*P* = .008). The most common age group was 18–44 y old followed with females making up more than 76% of all patients (**Table 2**). There was no difference in rates of in hospital mortality between racial groups. There was no difference in death rates between groups (*P* = .99).

DISCUSSION

The main finding of our study is that blacks had the highest crude unadjusted and adjusted procedure rates for MBS. It should be stressed that the procedure rate is rate per proportion of population, so although blacks make up less of the population in Texas than Hispanics, they have a greater proportional rate of surgery. This is similar to other studies using large databases such as the MBSAQIP. The 2015 MBSAQIP database was used to extract data showing differences in mortality, length of stay, readmission, and reintervention by race. They found the black population had higher BMI preoperatively, longer length of stay postoperatively, and higher rates of readmission following LRYGB and SG. They also found a higher 30-d mortality rate in black patients undergoing SG.⁵ But as far as access to care, they found that 18% of LRYGB and 23% of SG were black. Because the proportion of the US

Table 1. Summary Descriptive in the Entire Cohort, and Across Years

Factor	Entire Cohort	Year					P Value
		2013	2014	2015	2016	2017	
n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	
n	99,501	19,961	20,161	19,613	20,342	19,424	<.001
Race							
Black	16,014 (16.1%)	3224 (16.2%)	3259 (16.2%)	3039 (15.5%)	3323 (16.3%)	3169 (16.3%)	
White	64,537 (64.9%)	12,647 (63.4%)	12,869 (63.8%)	12,367 (63.1%)	13,311 (65.4%)	13,343 (68.7%)	
Other/American Indian/Asian	18,697 (18.8%)	4002 (20.0%)	4026 (20.0%)	4130 (21.1%)	3673 (18.1%)	2866 (14.8%)	
Unknown/missing	253 (0.3%)	88 (0.4%)	7 (<1%)	77 (0.4%)	35 (0.2%)	46 (0.2%)	
Ethnicity							.016
Hispanic	21,034 (21.1%)	3897 (19.5%)	4042 (20.0%)	3807 (19.4%)	4201 (20.7%)	5087 (26.2%)	
Non-Hispanic	77,748 (78.1%)	15,891 (79.6%)	16,000 (79.4%)	15,630 (79.7%)	16,023 (78.8%)	14,204 (73.1%)	
Unknown/missing	719 (0.7%)	173 (0.9%)	119 (0.6%)	176 (0.9%)	118 (0.6%)	133 (0.7%)	
Race/ethnicity							<.001
HW	10,375 (10.4%)	1306 (6.5%)	1624 (8.1%)	1724 (8.8%)	2324 (11.4%)	3397 (17.5%)	
Non-Hispanic Asians (NHA)	275 (0.3%)	47 (0.2%)	52 (0.3%)	54 (0.3%)	55 (0.3%)	67 (0.3%)	
Non-Hispanic blacks (NHB)	15,633 (15.7%)	3197 (16.0%)	3234 (16.0%)	3016 (15.4%)	3298 (16.2%)	2888 (14.9%)	
Non-Hispanic whites (NHW)	54,035 (54.3%)	11,282 (56.5%)	11,237 (55.7%)	10,616 (54.1%)	10,987 (54.0%)	9913 (51.0%)	
Other Hispanics	10,601 (10.7%)	2549 (12.8%)	2416 (12.0%)	2083 (10.6%)	1876 (9.2%)	1677 (8.6%)	
Other Non-Hispanics	7742 (7.8%)	1321 (6.6%)	1474 (7.3%)	1943 (9.9%)	1682 (8.3%)	1322 (6.8%)	
Unknown	840 (0.8%)	259 (1.3%)	124 (0.6%)	177 (0.9%)	120 (0.6%)	160 (0.8%)	
Race/ethnicity (combined)							.001
Hispanics (HW + other Hispanics)	20,976 (21.1%)	3855 (19.3%)	4040 (20.0%)	3807 (19.4%)	4200 (20.6%)	5074 (26.1%)	
NHB	15,633 (15.7%)	3197 (16.0%)	3234 (16.0%)	3016 (15.4%)	3298 (16.2%)	2888 (14.9%)	
NHW	54,035 (54.3%)	11,282 (56.5%)	11,237 (55.7%)	10,616 (54.1%)	10,987 (54.0%)	9913 (51.0%)	
Others (NHA, other non-Hispanics)	8017 (8.1%)	1368 (6.9%)	1526 (7.6%)	1997 (10.2%)	1737 (8.5%)	1389 (7.2%)	
Unknown	840 (0.8%)	259 (1.3%)	124 (0.6%)	177 (0.9%)	120 (0.6%)	160 (0.8%)	
Group							.064
Inpatient	73,609 (74.0%)	15,824 (79.3%)	15,377 (76.3%)	14,064 (71.7%)	14,200 (69.8%)	14,144 (72.8%)	
Outpatient	25,892 (26.0%)	4137 (20.7%)	4784 (23.7%)	5549 (28.3%)	6142 (30.2%)	5280 (27.2%)	
HW, Hispanic whites; NHB, non-Hispanic blacks; NHW, Non-Hispanic whites.							

Table 2.
Racial and Ethnic Disparities in Selected Cofactors

Factor	Ethnicity				P Value
	Entire Cohort	Hispanics	Non-Hispanic Blacks	Non-Hispanic Whites	
	n (%)	n (%)	n (%)	n (%)	
n	99,501	20,976	15,633	54,035	
Length of stay (d), mean (SD)	2.0 (3.7)	2.0 (2.9)	2.2 (5.0)	1.9 (3.8)	.008
Age groups (y)					<.001
18–44	50,166 (50.4%)	12,644 (60.3%)	8643 (55.3%)	24,009 (44.4%)	
45–69	42,144 (42.4%)	7275 (34.7%)	6455 (41.3%)	24,884 (46.1%)	
65–74	6505 (6.5%)	857 (4.1%)	467 (3.0%)	4784 (8.9%)	
75+	286 (0.3%)	37 (0.2%)	15 (0.1%)	218 (0.4%)	
<18	400 (0.4%)	163 (0.8%)	53 (0.3%)	140 (0.3%)	
Gender					<.001
Female	77,291 (77.7%)	16,047 (76.5%)	13,218 (84.6%)	41,043 (76.0%)	
Male	21,644 (21.8%)	4826 (23.0%)	2275 (14.6%)	12701 (23.5%)	
Unknown	566 (0.6%)	103 (0.5%)	140 (0.9%)	291 (0.5%)	
Insurance					.001
Public insurance	12,726 (12.8%)	2871 (13.7%)	2380 (15.2%)	6769 (12.5%)	
Veterans, etc.	1766 (1.8%)	316 (1.5%)	254 (1.6%)	932 (1.7%)	
Others	84,883 (85.3%)	17,772 (84.7%)	12,991 (83.1%)	46,305 (85.7%)	
Unknown	126 (0.1%)	17 (0.1%)	8 (0.1%)	29 (0.1%)	
Death					.99
No	99,419 (99.9%)	20,956 (99.9%)	15,620 (99.9%)	53,990 (99.9%)	
Yes	82 (0.1%)	20 (0.1%)	13 (0.1%)	45 (0.1%)	

population that identifies as black is 12.3%, this matches our findings of increased crude unadjusted procedure rates for black patients. The Department of Health and Human Services reports that 48% of non-Hispanic black Americans are obese.¹¹ We found that even when adjusted by sex, race, and obesity, black females had the highest access to bariatric surgery in Texas. The adjusted rate was based on some assumptions but is as accurate as we could make it. The US Census reports obesity rates starting from a BMI of 30 kg/m². However, bariatric surgery is performed on patients with a BMI of 35 kg/m² or greater. Also we used the demographic data from 2015, which was the only available year, and it is possible but not likely that there was a large swing during the study period. The data for obesity in blacks were not split by sex, but we assumed that the male:female ratio would be even. Despite these assumptions, we believe the adjusted procedure rate

still shows that black females have a higher procedure rate than other groups.

Others have shown the opposite, namely a decrease in access to MBS for blacks. A study by Worni et al.,¹² which used the Nationwide Inpatient Sample database, showed that the probability of being admitted for LRYGB among obese hospitalized patients was significantly different between whites, blacks (odds ratio 0.48, $P < .001$) and Hispanics (odds ratio 0.59, $P < .001$). Additionally, they found that whereas the odds of blacks undergoing LRYGB in the years of their study period (2002–2008) increased compared with whites, there was no such increase for Hispanics.¹² Nationwide there are significant disparities in access to bariatric surgery. Martin et al.³ found disparities among the blacks, low-income families, and the underinsured. They used the National Examination Survey to

identify more than 22 million people considered as eligible for bariatric surgery from 2005 through 2006. Within the eligible population, there were higher proportions of female, black race, underinsured, less educated, and lower family income when compared against the noneligible population, suggesting there is a great need for bariatric surgery among these populations. Of the nearly 90 thousand in-patient bariatric surgical procedures that were performed in 2006, 75% were white, 55% were above median income, and 82% had private insurance.³ Additionally Hennings et al.¹³ found in a case control analysis of the National Inpatient Sample from 2003 through 2010, the population with public insurance has a higher rate of obesity and obesity-related complications but is significantly less likely to undergo bariatric surgery than the privately insured population.

Hispanic patients have been shown to have a significantly lower likelihood of referral compared with black or white patients. In a 5-y study that looked at 38,567 patients visiting primary care clinics, of 4,736 patients who were eligible for bariatric surgery, Hispanic patients were significantly less likely to be referred compared with black or white patients (2.0% versus 5.3%, $P = .019$). The authors of this study postulated that the differences in referral rate may be explained by the disproportionate number of Hispanic patients that were designated as self-pay rather than private insurance or Medicaid/Medicare coverage that is required for bariatric surgery referral (84.2% in Hispanic patients versus 38.6/34.5% in black and white patients, respectively).¹⁴ They also suggested that another barrier to referral might be the underlying socioeconomic status or cultural differences among patient populations.

A study by Poulouse et al.¹⁵ suggested that the rates of bariatric surgery did not coincide with the burden of morbid obesity in regions across the United States. They found that bariatric surgery rates in the West and Northeast were significantly higher than those in the South or Midwest, despite the higher burden of disease in the South and Midwest.¹⁵ This was also found to be the case in New York when the Statewide Planning and Research Cooperative System administrative database from 2005 through 2016 was analyzed, showing most patients undergoing bariatric surgery had private insurance. They also found a correlation between patients covered by Medicare and higher complication rates, 30-d readmissions, and longer length of stay postoperatively.¹⁶ Interestingly, our results from examining the Texas PUDF showed that the MBS procedure rate was higher in the black population than the non-Hispanic white and Hispanic populations.

Birkmeyer and Gu¹⁷ looked at MBS rates in 2010 by ZIP code in Michigan. They found an inverse relationship of MBS to socioeconomic status in whites but a direct relationship between MBS and socioeconomic status (SES) among racial minorities. They suggested that this is congruent with the relationships of obesity to SES, especially for whites, but SES is less predictive of obesity in minority populations. They also suggested rates of private insurance may differ among races, altering access to care. Cultural differences are also a potential confounder, explaining low rates of MBS in low-SES racial minority patients. An interesting finding parallel to our own is that highest use was seen among black females, (followed by white females and then other racial minority females). Unlike our findings, they did not find evidence of wide disparities in the use of MBS. They defined morbid obesity as BMI > 40 kg/m², and weights were self-reported to the Department of Motor Vehicles but corrected for bias. They used a state hospital database, similar to our study. Their significant finding was a lower rate of MBS in racial minority patients with low SES.

Our paper has demonstrated severe inequalities to MBS in Texas. Texas is a large state with a growing Hispanic population. These inequalities will hopefully correct over time, but access to MBS needs to remain an important area of research and advocacy for surgeons.

Strengths and Limitations

The strengths of this paper lie in the ability of a state administrative database to effectively capture demographic data. In this, the Texas PUDF outperforms the MBSAQIP PUF. The MBSAQIP is a clinical database, and its entire emphasis is on clinical outcomes and lists only race and ethnicity but can tell us nothing about cost and insurance coverage. The PUDF is specifically designed with these last two metrics in mind. The limitations are inherent to data collection in large databases. With more than 12,000,000 records a quarter recorded from almost every hospital in Texas, there are going to be gaps and mistakes in data entry. The reporting facilities are given guidelines on what needs to be reported but not how to train data entry personnel. Therefore, there can be wide variation in the quality of data reported and coding. Another limitation is self-reporting and self-identification of race and ethnicity by the patients themselves. SES is also not available in the Texas PUDF, but SES may likely play a more important role in access to care than race or ethnicity.

CONCLUSIONS

There are disparities in access to bariatric surgery in Texas. In contradistinction to other published studies, in Texas, blacks have the greatest access followed by whites. Hispanics have the lowest procedure rate per population. If demographics shifts continue in the current trend, Hispanics will soon be the most populous ethnicity in the state, and rates of bariatric surgery will likely adjust to meet demand. Future studies will be needed to monitor these changes and administrative databases will play a central role in these studies.

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